

Translation of PCT/EP2004/002798

5 NOZZLE FOR SPRAYING LIQUID SUBSTANCES, DISPERSIONS,
EMULSIONS, OR SUSPENSIONS

The invention relates to a nozzle for spraying liquid substances, dispersions, emulsions, or suspensions with the features noted in the preamble of Claim 1.

10

Nozzle constructions for spraying liquid substances, dispersions, emulsions, or suspensions into a fluidized bed granulating system are generally known. The appropriate nozzle constructions are especially adapted to the field of application of materials to be produced in the fluidized bed granulating system. For example, two-component nozzles are known, which usually include a centrally arranged inner tube and an outer tube spaced apart from this inner tube. The liquid substance to be sprayed into the fluidized bed is fed to the inner tube, while an atomizing gas is fed to the outer tube.

20 Corresponding to the material to be produced, it is also known to provide the nozzle as a three-component or four-component atomizing nozzle, or, in general, as a multi-component atomizing nozzle. In this way, the materials to be atomized differently and the atomizing gas are fed into the resulting intermediate spaces between the individual tubes or channels.

25

A disadvantage in these nozzles is their difficult cleaning, because the nozzles are difficult to access and must be built with large expense for cleaning. Especially in the food industry and in other intensely hygienic industries, as well as in the chemical industry, high demands are placed on the cleanliness 30 of the system, so that it is necessary to subject the nozzles to cleaning processes at certain intervals.

The objective of the invention is to create a nozzle according to the class for use in the food and chemical industries, which is distinguished by good accessibility and which can be easily disassembled and assembled for a necessary cleaning process without great expense.

5

This objective is solved according to the invention by the characterizing features of Claim 1.

According to the invention, because the inner tube of the nozzle is mounted in
10 a receiving block, which is attached detachably in a tube arranged in a fixed manner on the bottom region of a lance base and which can be removed from this tube with the inner tube and the add-on parts possibly attached to the inner tube, and because an attachment device, which connects the nozzle detachably to the processing housing of the fluidized-bed granulating system,
15 is arranged at the bottom region of the outer tube of the nozzle, the nozzle can be disassembled with a few hand movements and the individual parts can be subjected to a corresponding cleaning process. Through the arrangement of the corresponding attachment means, good accessibility to these means is also given, so that the nozzle can be quickly uninstalled and also
20 reinstalled.

Additional advantageous configurations are described in the subordinate claims. They are explained together with their effect in the description.

25 The invention is explained in more detail below with reference to an embodiment. In the associated drawing, a nozzle for spraying liquid substances, dispersions, emulsions, or suspensions into a fluidized-bed granulating system is illustrated schematically.

The solution according to the invention is explained using a known two-component nozzle. The solution according to the invention can also be used analogously for three-component or four-component nozzles.

5 The known two-component nozzle includes a cylindrical nozzle body, which is formed from a central inner tube 3 and an outer tube 2 spaced apart from this inner tube, and of a nozzle mouth piece 1. The inner tube 3 is connected with its bottom end to a supply for the material to be sprayed, while the atomizing gas is fed to the nozzle mouth piece 1 via the intermediate space
10 produced between the inner tube 3 and the outer tube 2.

According to the invention, the inner tube 3 is mounted in a receiving block 11, which is attached in a tube 10 arranged in a fixed manner at the bottom region of a lance base 9. The receiving block 11 is detachably attached, for
15 example, by means of a tri-clamp attachment 12, to the tube 10, so that the receiving block 11 can be removed from the nozzle with the inner tube 3 and the add-on parts 6 attached to the inner tube after loosening the attachment 12 for cleaning purposes. The attachment of the inner tube 3 on the receiving block 11 can be realized in the simplest case by welding the inner tube 3 with
20 the receiving block 11.

It is especially advantageous to screw the inner tube 3 into the receiving block 11. In this way, the possibility arises of setting the axial position of the inner tube 3, or of a liquid insert 4 to be explained in even more detail, in the
25 region of the nozzle mouth piece 1 variable relative to the outer tube 2. By setting the inner tube 3 in the axial direction, the spray angle and the spray pattern of the nozzle can be set continuously from the outside. For such a setting possibility of the inner tube 3, the seal 14 between the receiving block 11 and the inner tube 3 within the lance base 9 is a metal compensator or an

elastic O-ring in order to be able to seal the entire adjustment path hygienically.

For realizing different spraying conditions, the inner tube 3 is provided with
5 an exchangeable liquid insert 4 in the region of the nozzle mouth piece 1. The
seal between the exchangeable liquid insert 4 and the inner tube 3 is realized
in an advantageous way by means of a simple metal seal set 5 in order to
avoid sealing materials. In the region of the nozzle mouth piece 1, in the
annular gap between the outer tube 2 and the liquid insert 4 or the inner
10 tube 3, there is an add-on part 6 in the form of swirl bodies, swirl vanes, or
the like. These add-on parts 6 are used for guiding the compressed air and for
guiding the inner tube 3. The add-on part 6 is connected rigidly to the inner
tube 3 or alternatively to the liquid insert 4 or to the outer tube 2.

15 The attachment of the nozzle on the processing housing 15 of the fluidized-bed granulating system is realized by means of an attachment device 8, which is arranged in the bottom region of the outer tube 2. The detachable attachment of the nozzle on the processing housing 15 is realized, for example, by a milk-tube union nut 7 or by means of a tri-clamp attachment.
20 Here, the attachment device 8 is connected rigidly or adjustably to the outer tube 2 by means of a clamping sleeve. Between the outer tube 2 and the attachment device 8, as well as between the processing housing 15 and the attachment device 8, there is a seal 16. As the seal 16, O-rings or other hygienic seals can be used.

25

Through the attachment according to the invention of the nozzle onto the processing housing 15, the nozzle can be uninstalled and also reinstalled quickly and with minimal effort from the processing housing 15 for the purpose of cleaning.

30

The outer tube 2 is connected detachably, for example, by means of a tri-clamp attachment 13, to the lance base 9, whereby likewise a quick and uncomplicated disassembly and assembly of the parts is given. The outer tube 3 is provided in a region of the connection to the lance base 9 with an 5 expanding diameter. A supply for the atomizing gas or for the support-gas stream opens in the base 9.

In summary, the following can be emphasized:

10 The invention relates to a nozzle for spraying liquid substances, dispersions, emulsions, or suspensions into a fluidized-bed granulating system.

The objective of the invention is to create a nozzle according to the class especially for use in the food and chemical industries, which is distinguished by good accessibility and which can be easily disassembled and assembled 15 without great effort for a necessary cleaning process.

According to the invention, the inner tube of the nozzle is mounted in a receiving block, which is detachably attached in a tube in a fixed manner on the bottom region of a lance base and can be removed from this tube with the 20 inner tube and add-on parts possibly attached to the inner tube, and an attachment device, which connects the nozzle detachably to the processing housing of the fluidized-bed granulating system, arranged at the bottom region of the outer tube of the nozzle.